Answers for class prep quiz on section 3.1, Stewart's Calculus (8th ed.)

1. **Answer:** (b); the power rule only applies when x is the base and the exponent is constant. (c) is incorrect because 7^x is not the same as $7x$; (d) is incorrect because the only exponential function whose derivative we know (for the moment) is e^x.

2. **Answer:** (c); again, the exponential function rule only applies when the function is *precisely* e^x. (b) and (d) are incorrect because the power rule only applies when the base is x and the exponent is constant.

3. **Answer:** (b); the product law turns out to be more complicated than that. (As we'll see, the correct statement is actually $\frac{d}{dx}(f(x)g(x)) = f'(x)g(x)+f(x)g'(x)$.) (d), (a), and (c) are precisely the sum, difference, and constant multiple laws.

4. **Answer:** (d). We have:

$$\begin{aligned} h'(x) &= \frac{d}{dx}\left(3x^5\right) - \frac{d}{dx}\left(7e^x\right) + \frac{d}{dx}\left(5x^{1/2}\right) && \text{(sum, difference)} \\ &= 3\frac{d}{dx}\left(x^5\right) - 7\frac{d}{dx}\left(e^x\right) + 5\frac{d}{dx}\left(x^{1/2}\right) && \text{(const multiple)} \\ &= 3(5x^4) - 7e^x + 5((1/2)x^{-1/2}) && \text{(power, exp)} \\ &= 15x^4 - 7e^x + \frac{5}{2\sqrt{x}}. \end{aligned}$$